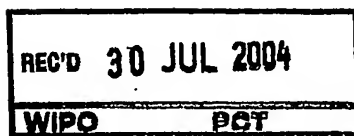




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Thirteenth day of July 2004

*J. Billingsley*

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**AUSTRALIA**

**PATENTS ACT 1990**

**PROVISIONAL SPECIFICATION**

***FOR THE INVENTION ENTITLED:-***

**"RAINSCREEN APPARATUS AND METHOD"**

**The invention is described in the following statement:-**

### **Field of the Invention**

This invention relates to rainscreen apparatus and methods of constructing rainscreens and is directed particularly, but not solely to pressure equalised rainscreens.

### **Background**

5 Entry of water, particularly wind driven rain into buildings is frequently a problem especially when developing new less costly cladding and construction systems.

One way of preventing ingress of water is to provide a screen which covers external walls that may be at risk of rain penetration.

### **Object**

10 It is an object of the present invention to provide improved rainscreen apparatus or methods which will at least go some way toward overcoming one or more problems associated with existing rainscreen apparatus or methods of constructing rainscreens, or to at least provide the public with a useful alternative.

### **Summary of the Invention**

15 In one aspect the invention broadly provides rainscreen apparatus including:  
a substantially rigid sheet building material to provide an air barrier panel adapted to be attached to a building structure,  
a fibre reinforced rainscreen panel,  
a spacing member for disposal between the panels and a sealing means to  
20 provide a pressure equalised space between the panels.

Preferably the apparatus includes an air vent to atmosphere from the pressure equalised space to allow air pressure within the space to equalise with air pressure externally of the space.

Preferably the building material from which the air barrier is constructed may be  
25 a fibre reinforced cement material.

Preferably the air barrier may be between approximately 2mm-15mm thick, most preferably 5mm-7mm thick.

Preferably the rainscreen panel may be between approximately 2mm-15mm thick. More preferably the rainscreen panel may be 7mm-11mm thick and may most  
30 preferably be 9mm thick.

In a further aspect the invention broadly provides rainscreen apparatus including:  
a substantially rigid air barrier panel adapted to be attached to a building structure,  
a rainscreen panel,

a spacing member for disposal between the panels and a sealing means to provide a pressurisable space between the panels.

Preferably the apparatus includes an air vent to atmosphere from the pressure equalised space to allow air pressure within the space to equalise with air pressure externally of the space.

Preferably one or both of the panels may be fibre reinforced cement panels.

In a further aspect the invention broadly provides a rainscreen air barrier joint seal for sealing a joint between at least two adjacent air barrier panels of rainscreen apparatus, the seal including a sealing strip of a substantially resilient material having a first surface and a second surface opposite to the first surface, the first surface being adapted to contact the panels, and at least one batten provided in use over the second surface of the seal strip, the batten being in contact with the second surface so as to maintain the first surface of the strip in contact with the region of the air barrier adjacent to the joint.

Preferably the first surface has an adhesive provided thereon.

Preferably the second surface has an adhesive provided thereon.

In a further aspect the invention broadly provides a rainscreen flashing including a first edge portion adapted to be located on or adjacent to a lower edge of an air barrier panel of rainscreen apparatus, a second edge portion adapted to be located on or adjacent to an upper region of a rainscreen panel provided below the air barrier panel, and a central portion which is contiguous with the first and second edge portions and is provided at a substantially obtuse angle to the first and second edge portions.

Preferably the central portion slopes downwardly to allow water to drain over the central portion and exteriorly of the rainscreen panel.

In a further aspect the invention broadly provides a rainscreen vent for rainscreen apparatus having an air barrier panel and a rainscreen panel and a space therebetween, the vent including a first wall adapted for location on or adjacent to the air barrier panel, a second wall adapted to be located on or adjacent to an internal surface of the rainscreen panel, and a central portion connected between the first and second walls, the central portion having one or more apertures therein, the one or more apertures allowing liquid to drain from the space and also allowing ingress of air into the space.

In a further aspect the invention broadly provides as rainscreen seal construction including a batten for location on an air barrier of rainscreen apparatus, a sealing

member having a base and at least two lips projecting from the base, the lips being spaced from each other, one lip being adapted to make a substantially sealing contact with a rear surface of a first rainscreen panel, and the second lip being adapted to make a substantially sealing contact with the rear surface of a second rainscreen panel, the second panel being located adjacent to the first panel.

In a further aspect the invention broadly provides a method of constructing a rain screen, the method including the steps of attaching a substantially rigid air barrier panel to an external side of building framing, attaching one or more battens over an exterior surface of the air barrier panel, and attaching a rainscreen panel over the battens.

Preferably one or both of the panels may be fibre reinforced cement panels.

Preferably one or both of the panels incorporate water resistant technology.

In a further aspect the invention broadly provides a method for constructing a rainscreen, a method including the steps of:

providing a substantially rigid air barrier panel,

coating the panel with a water resistant material,

attaching one or more battens over an exterior surface of the air barrier panel, and

fixing a rainscreen panel over the battens so that the rainscreen panel is spaced from the air barrier panel, and

coating the exterior surface of the rainscreen panel with a substantially water resistant material.

Preferably one or both of the panels may be fibre reinforced cement panels.

Alternatively the step of coating the panels includes the step of providing one or both panels with inherent water resistance.

#### **Drawing Description**

One or more examples of the invention will be described below with reference to the accompanying drawings in which:

Fig. 1 is a front elevation of a two storey building structure;

Fig. 2 is a front elevation of the structure of Fig. 1 including an air barrier affixed thereto;

Fig. 3 is an elevation of Fig. 2 further including battens provided over the air barrier;

Fig. 4 is a front elevation of the structure of Fig. 3 and further including a rainscreen provided over the battens;

Fig. 5 is a plan view of Fig. 4;

Fig. 6 is a side elevation and cross section of detail of A of Fig. 4;

Fig. 6A is an isometric sketch of a vent;

Fig. 7 is a plan view and cross section of detail B of Fig. 4;

Fig. 8 is a plan view and cross section of detail C of Fig. 4;

Fig. 9 is a side elevation and cross section of detail D of Fig. 4;

Fig. 10 is a partial elevation of Fig. 4 showing detail E of that figure;

Fig. 11 is a side elevation and cross section showing detail F of Fig. 4;

Fig. 12 is a partial elevation of Fig. 4 showing detail G of that figure;

Fig. 13 is a sectional plan view showing detail H of Fig. 5: and

Fig. 14 is a plan view and cross section showing detail I of Fig. 5.

#### **Detailed Description**

Fig. 1 shows a building structure, and this example having structural concrete supports in the form of concrete columns 1 and a suspended concrete floor 2. Between the concrete structural supports, framing generally referenced 4 is provided including studs 5 and nogs 6. In this example, the framing is timber but those skilled in the art will appreciate that other framing materials may be used, for example steel frame materials. The structure in Fig. 1 represents an exposed exterior structure of a building, preferably but not necessarily a commercial building.

Turning to Fig. 2, the first step in cladding the framing so as to provide a rainscreen according to the invention is illustrated in which an air barrier generally referenced 8 is provided. In the example illustrated sheet building material provided as a number of separate sheets or panels is affixed to the framing in order to create the air barrier. The number of panels may vary, for example a single panel could be used and the number of panels will vary depending upon the dimensions of the panels that are used and the area of the structure required to be covered. In Fig. 2, twelve panels, each referenced 10 are shown. The panels preferably comprise a fibre reinforced cement sheet. The sheet is preferably between approximately 2mm-15mm thick, more preferably 5mm-7mm thick. At the vertical joints between sheets 10, a sealing strip 12 is provided as will be described in more detail below.

In Fig. 3, spacers in the form of battens 14 are shown placed over the air barrier. In this example the battens are preferably constructed from a treated timber material and are nominally 50 mm x 25 mm in cross section. Those skilled in the art will appreciate

that other materials may be used to provide spaces, for example steel battens. Further battens or spacers 16 may also be provided if necessary.

In Fig. 4 the structure of Fig. 3 is shown with a rainscreen provided from a sheet building material as sheets or panels 20 affixed over the battens so that there are a number of spaces provided between the rainscreen wall and the air barrier. Fig. 5 shows the partial structure in plan view in which spaces between the air barrier and rainscreen panels are referenced 21. In Fig. 4 and 5, the detail regions labelled A-H are shown in greater detail than the remaining figures.

Detail A is shown in Fig. 6 from which it can be seen that the air barrier panel 10 is affixed at its lower edge by a fastener such as nail 22 to the bottom plate 24 of the framing assembly. An appropriate screw such as a 65 mm x 10g wood thread screw 26 affixes the rainscreen panel, the batten and the air barrier panel to the bottom plate. The nail 22 may also hold a vent strip 28 in location at the base of the screen. The rainscreen panel 20 preferably comprises a fibre reinforced cement panel such as that marketed under the trademark Titan™ or Exotec™. The preferred thickness of panel 20 is 2mm-15mm, more preferably 7 - 11 mm. In this example the thickness is 9 mm. In Fig. 6A the vent strip is shown in greater detail as an isometric sketch which reveals it has a number of apertures 30 in the base which have sufficient dimension to allow any water such as rain water in the space between the panels 10 and 20 to drain from that space, while also allowing air entry to the space so that the space may be pressure equalised in use and therefore resist ingress of water such as wind driven rain.

Turning to Fig. 7, detail B of Fig. 4 is shown in which the connection of the rainscreen arrangement to a stud 5 is shown. A screw or similar fastener 32 connects screens 10 and 20 and a batten 14 securely to the stud.

In Fig. 8, a vertical joint between horizontally adjacent panels of the screen arrangement is illustrated. A sealing strip 34 which is nominally 48 mm wide and constructed from a resilient material such as an appropriate plastics or rubber material is laid over the joint between the adjacent air barrier panels 10. The sealing strip 34 preferably is coated with an adhesive on at least one side to assist with location about the joint. The battens 14 (which may alternatively comprise a single batten if desired) are provided directly over an upper surface of the sealing strip 34 so that one side of each batten holds the sealing strip securely in place.

On the other side of the battens 14, a further sealing strip 36 is provided having a

base 38 and two projecting sealing lips 40 projecting from the base. One lip 40 engages with the rear surface of each of the rainscreen panels 20. The arrangement is such that a substantial seal is made between the side edges of each of the panels 10 and 20.

Turning to Fig. 9, detail D of Fig. 4 is shown. In this figure, it can be seen that a flashing 42 is provided which has a first edge part 44 and a second edge part 46 for location on an air barrier panel and on an external surface of a rainscreen panel respectively. A central bridging portion 48 is angled at 90 degrees or more i.e. substantially obtusely to the edges 44 and 46. This provides a downwardly angled flow path which allows any water within the spaces of the upper panels as shown in Fig. 9 to drain out from between those panels and on to the exterior of the lower rainscreen panel shown in the figure. As well as allowing drainage, the flashing 42 also assists with sealing or at least protecting the seal between the lower air barrier panel and lower rainscreen panel. A seal created by sealant 48 over a backing PEF rod 50 for sealing vertically adjacent air barrier panels is also shown.

In Fig. 10, detail E of Fig. 4 is shown which again shows the seal strip 36 described above.

In Fig. 11, which shows detail F of Fig. 4, a joint between vertically adjacent panels as shown a short support batten 16 is used together with an aluminium socket 54 which screws 56 penetrate. A sealant 58 such as that sold under the trademark Fosroc MS sealant or similar is used between socket 54 and the edges of rainscreen panels 20.

In Fig. 12, the aluminium socket and sealant arrangement is shown in elevation in accordance with detail G of Fig. 4.

In Fig. 13, an external corner detail shown in which it can be seen that a sealing strip 60, for example an 80 mm wide strip of substantially resilient material such as butynol is provided. In Fig. 14, detail I of Fig. 5 is shown in which can be seen that a sealing strip the same as or similar to that described above with reference to Fig. 13 may also be used to provide an appropriate seal at an internal corner.

The outer surface, i.e. the surface away from the framing, of the air barrier panels 10 is preferably coated with a substantially water resistant coating. Similarly, the exterior surface, i.e. the surface opposite battens 14 of rainscreen panels 20 is also preferably coated with a substantially water resistant coating. The coatings may be provided as part of the sheet or panel manufacturing process or occur during or after installation. Also, as another alternative, a property of water resistance may be



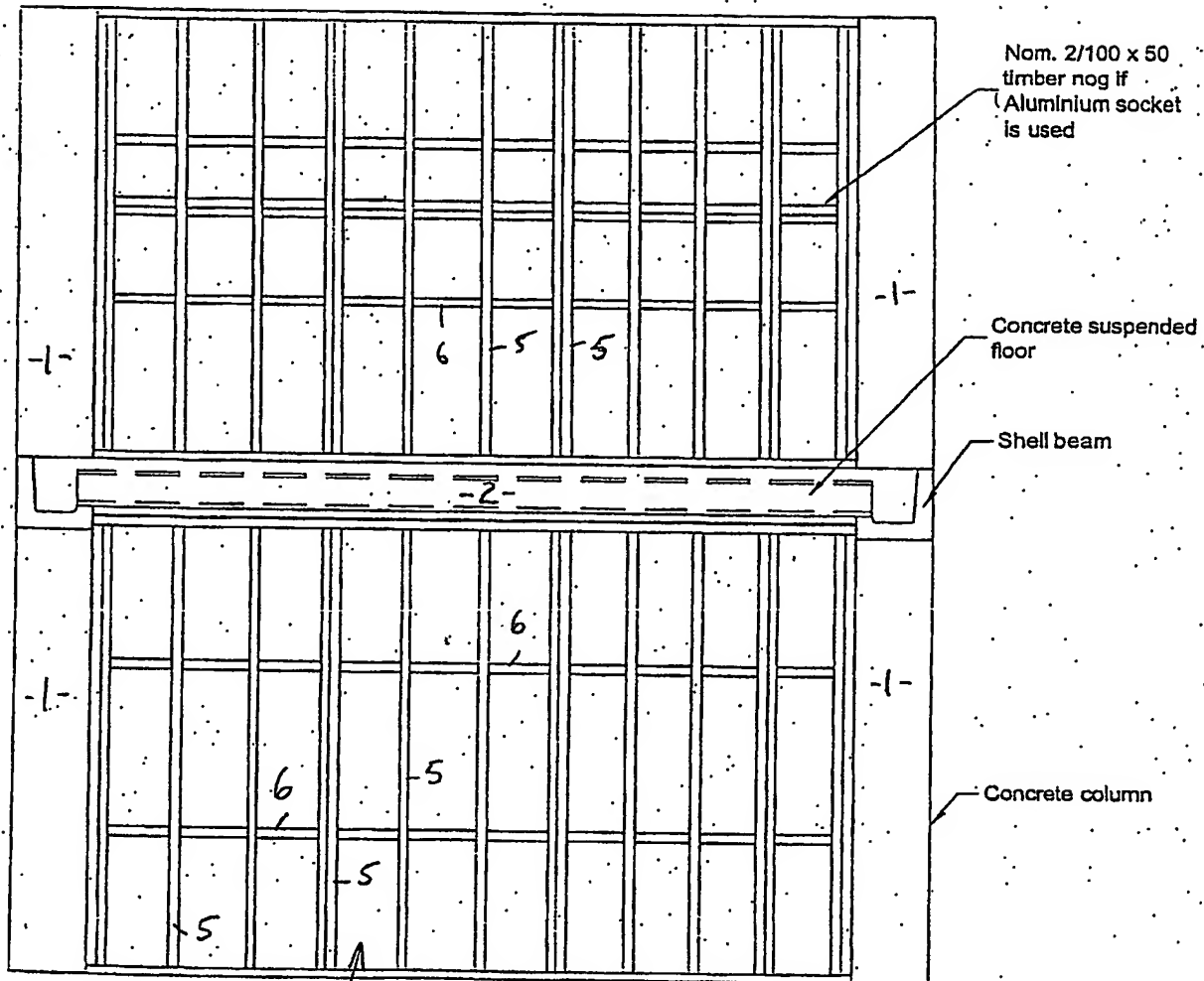
incorporated into the sheet material i.e. water resistant technology may be incorporated into the sheet material.

From the foregoing it can be seen that an effective rainscreen system, particularly a pressure equalised rainscreen, together with an effective sealing arrangement is provided. The sealing arrangement allows the spaces between air barrier and rainscreen panels to be effectively sealed along the side and upper edges while providing a vent at the lower edge. In this way air pressure within the spaces is equalised with exterior pressure such as that from wind for example. Therefore, there is no pressure differential to force water such as raindrops carried by wind to enter the spaces behind the rainscreen. As a result the rainscreen prevents rain from entering the building structure.

Where in the foregoing description, reference has been made to specific components or integers of the invention having known equivalents then such equivalents are herein incorporated as if individually set forth.

Although this invention has been described by way of example and with reference to possible embodiments thereof, it is to be understood that modifications or improvements may be made thereto without departing from the scope or spirit of the invention. Furthermore, various changes and modifications to the presently preferred embodiments described herein will be apparent to those skilled in the art. Such changes and modifications may be made without departing from the spirit and scope of the present invention and without diminishing its attendant advantages.

DATED this 4<sup>th</sup> Day of July 2003  
BALDWIN SHELSTON WATERS  
Attorneys for: JAMES HARDIE RESEARCH PTY LIMITED



14 FIG 1



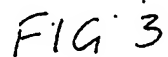
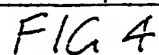


FIG. 3

Elevation

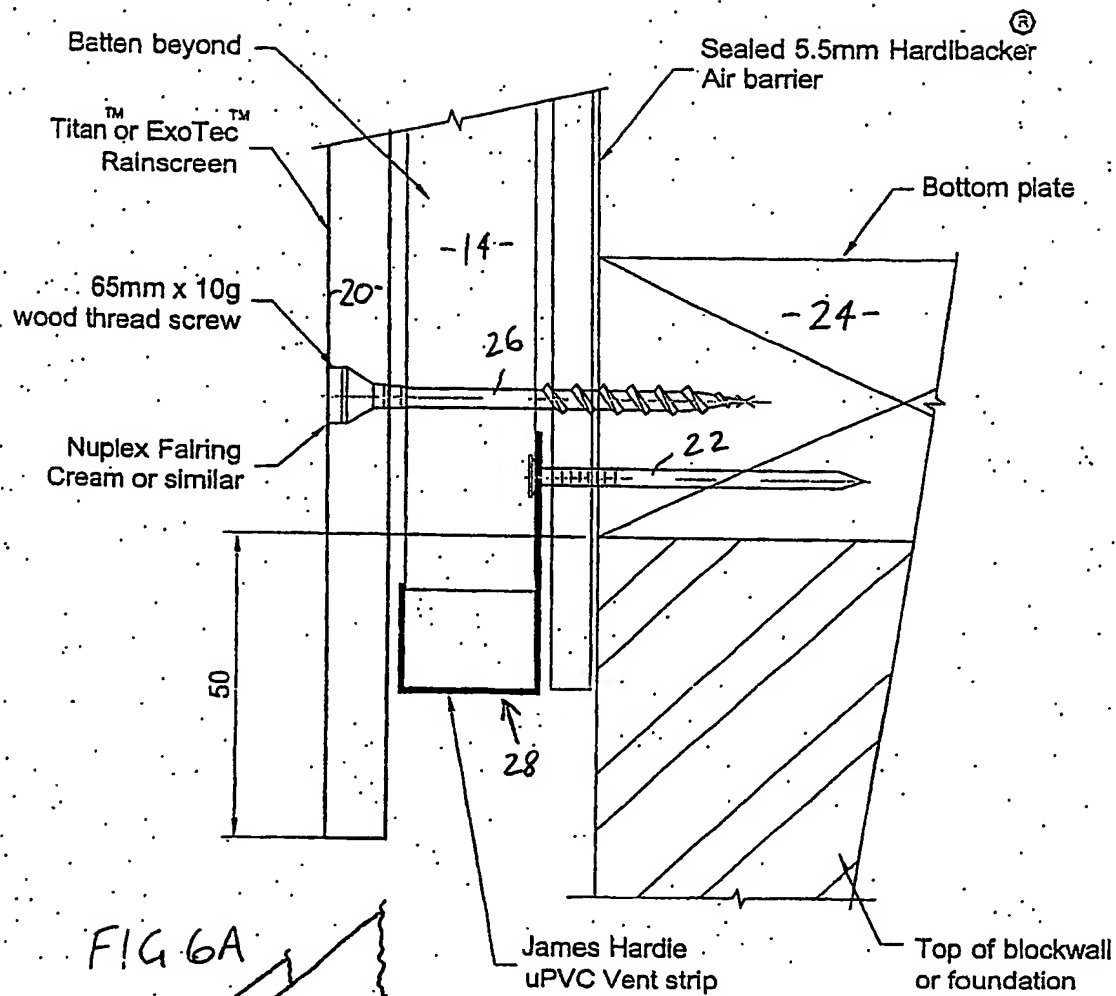


FIG 6A

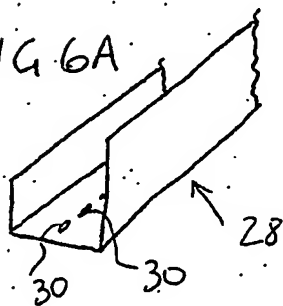
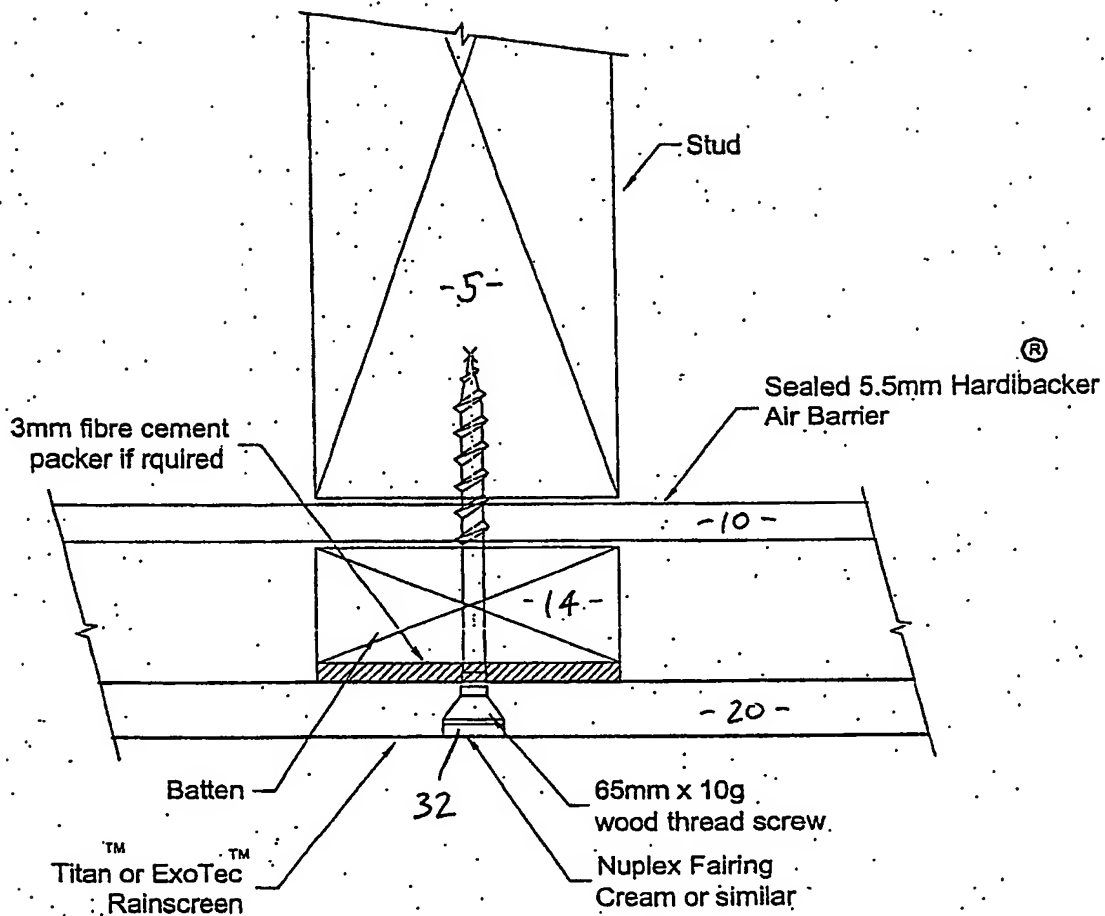


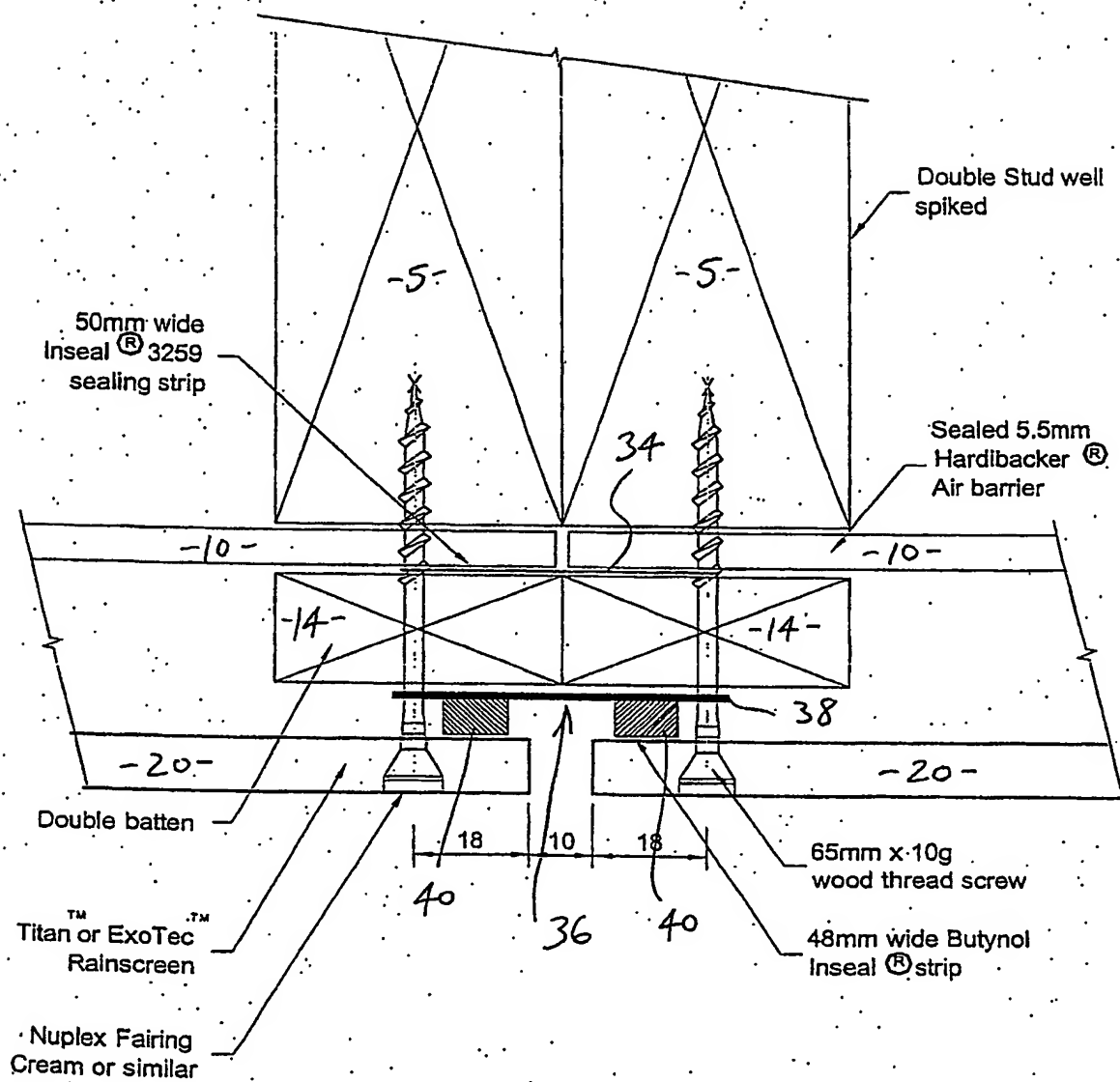
FIG 6

Detail A



Detail B

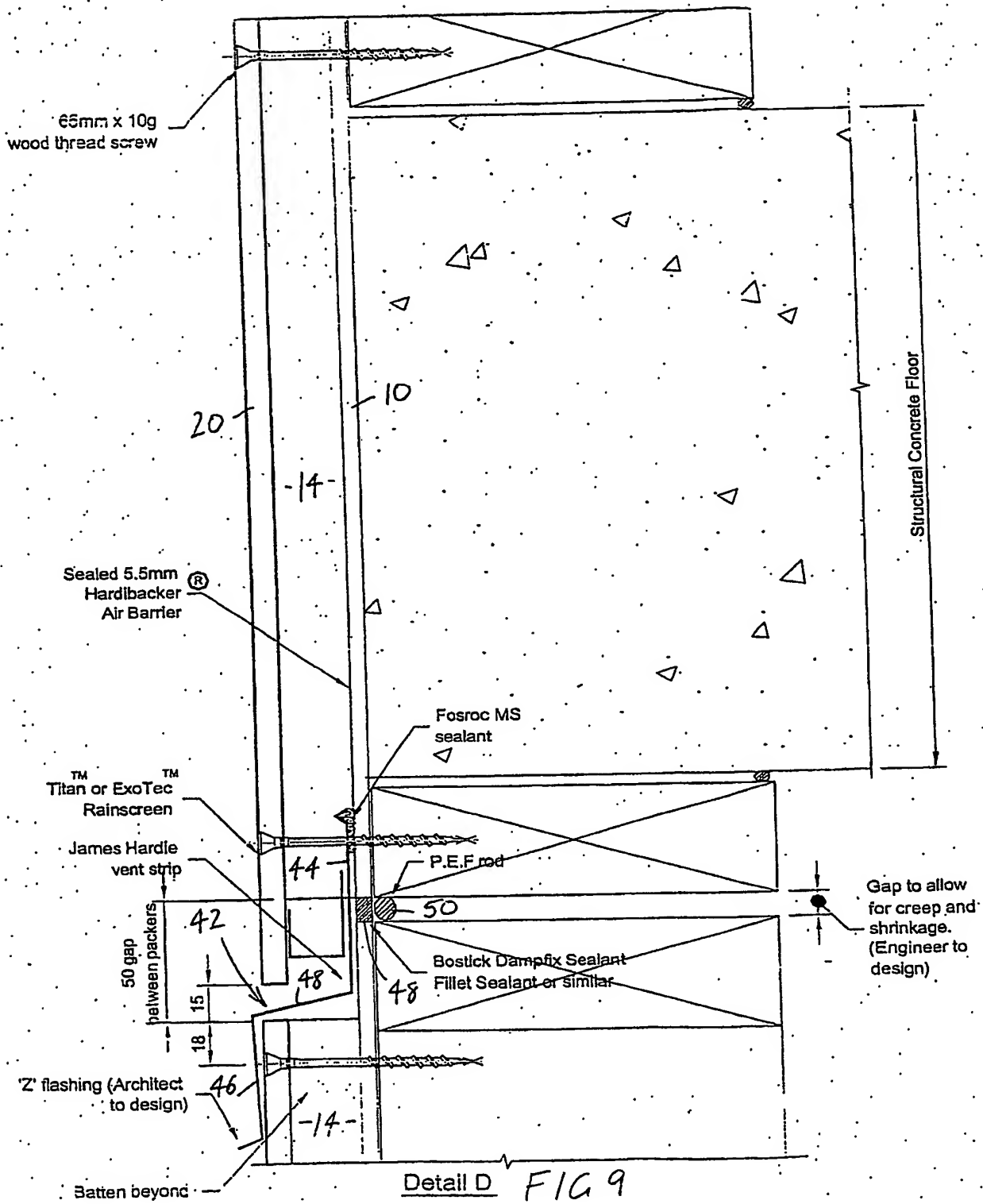
FIG 7

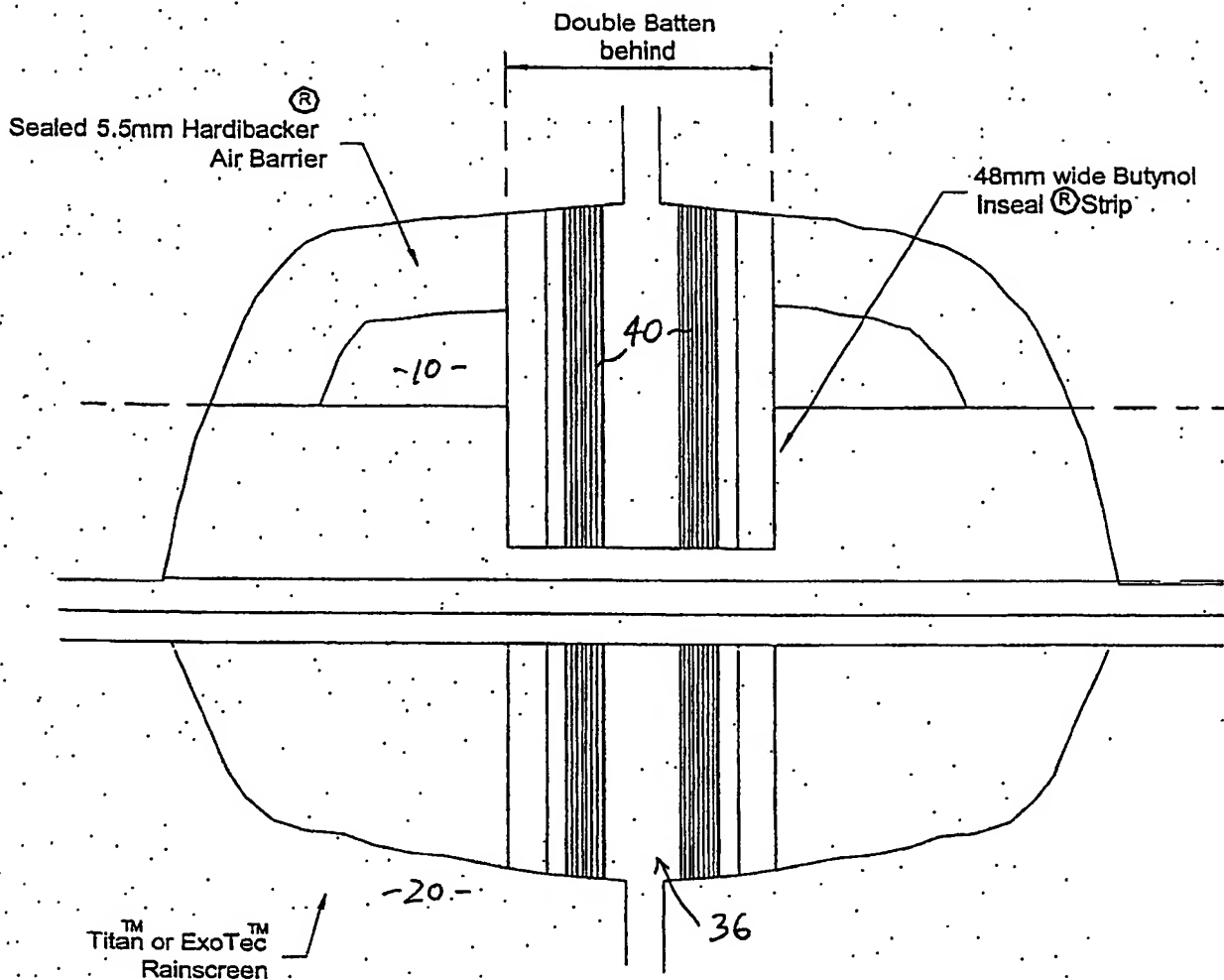


Detail C

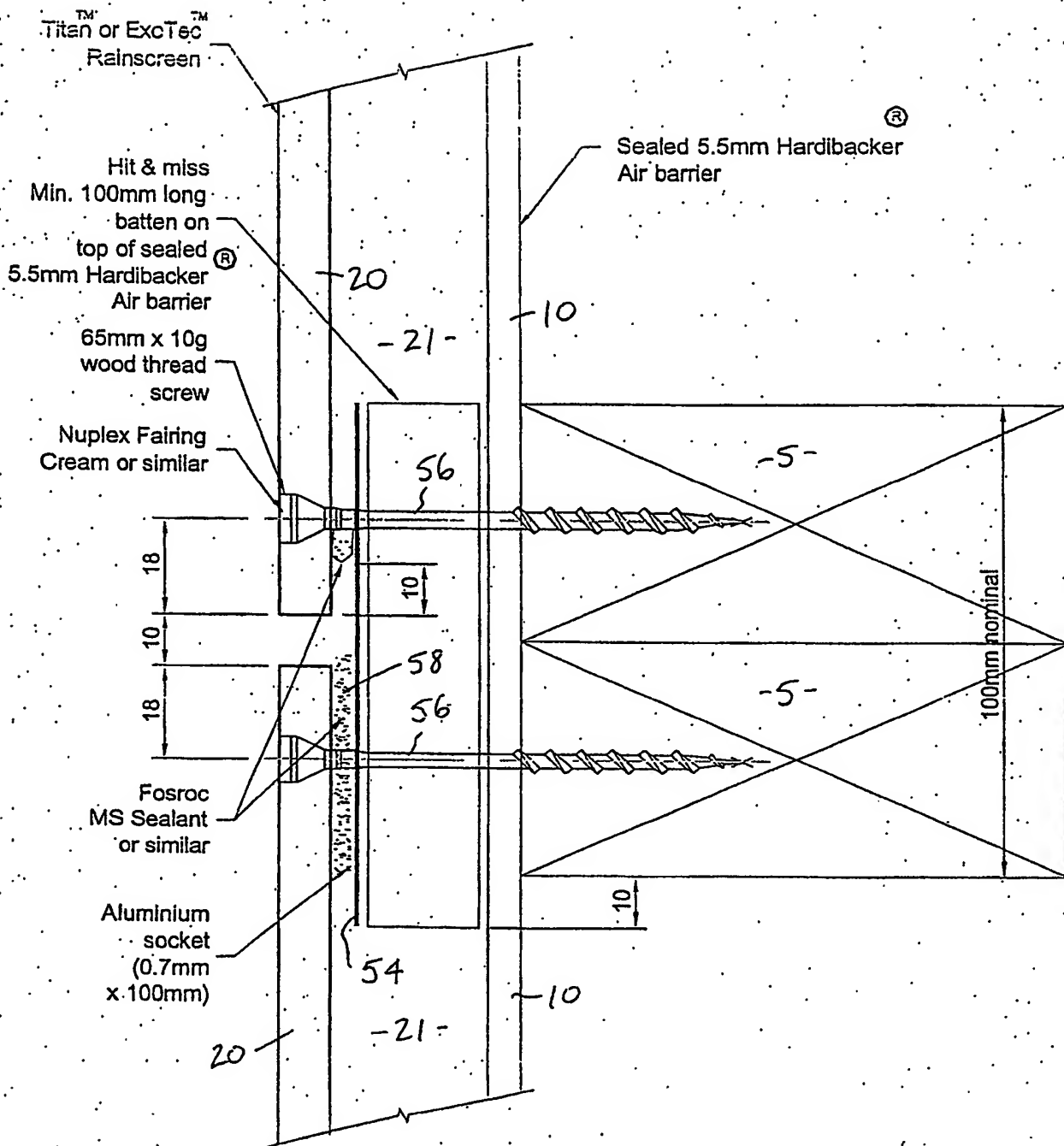
FIG 8





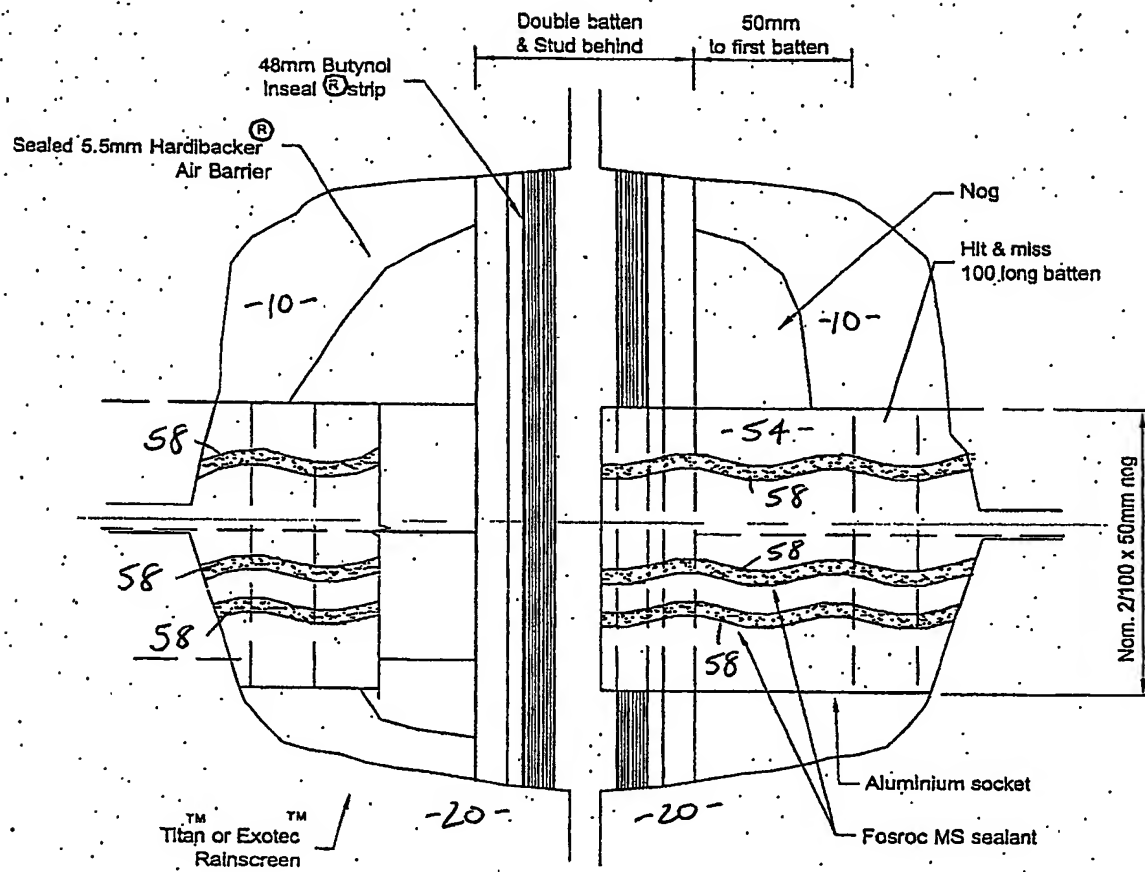


Detail E FIG 10



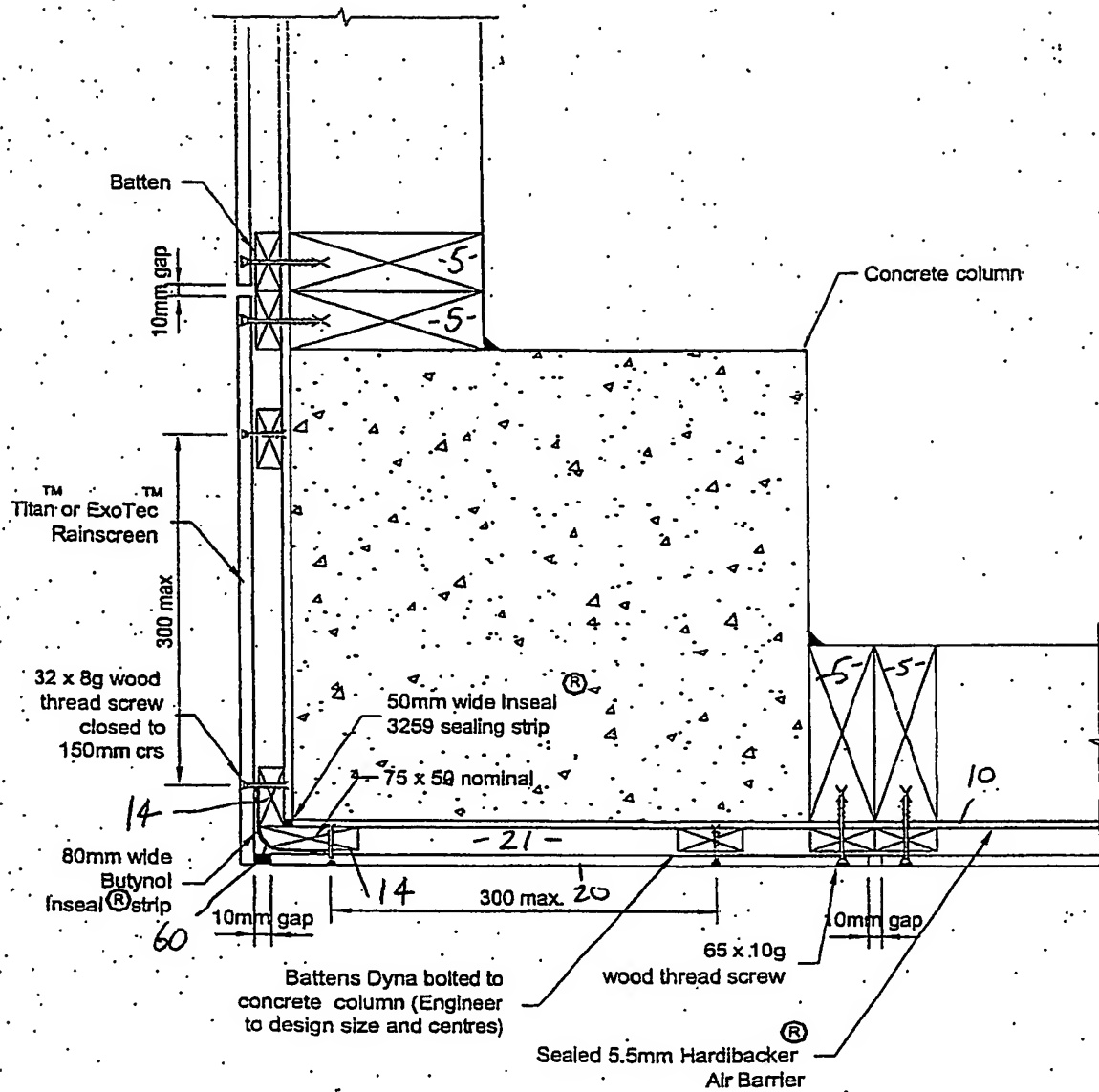
Detail F

FIG 11



Detail G

FIG. 1.2



Detail H

FIG. 13



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